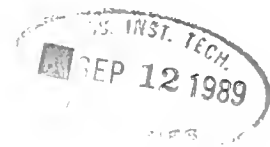


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IS Research Paradigms: Method versus Substance

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IS Research Paradigms:

Method versus Substance

Abstract

We examined 155 behavioral IS research articles published from 1983-1988 and found that while this research is not rooted in a single overarching substantive paradigm it does exhibit a single methodological paradigm, that of positivist methodology. We argue in this paper that this metatheoretic perspective, stemming as it does from the natural science tradition, is not always appropriate for investigating the relationship between information technology and human activity. In particular we urge the recognition of social process as inherent in any inquiry into the development and use of information systems within organizations.

In the light of such an emphasis on social process, the determination of meaning in social life becomes important, as do the dimensions of time and context. We argue that positivist research methods are not well-equipped to deal with situated meaning formation over time, and propose an additional research approach to augment the current investigations of behavioral IS researchers. We outline the features of such an additional paradigm, interpretivism, and indicate a number of research methodologies that subscribe to its tenets. We then suggest how such methodologies can usefully be used in the IS community to enrich its research efforts.

1. INTRODUCTION

One of the most pronounced features of contemporary social research - and by this we mean those disciplines concerned with human phenomena (individual and collective) such as psychology, sociology, anthropology and their applied fields of administrative science, education, industrial psychology and industrial sociology - is the great range of research perspectives or paradigms that operate concurrently [Astley & Van de Ven 1983; Burrell & Morgan 1979; Morgan 1980; Pfeffer 1982]. These disciplines are marked by a plethora of "schools of thought" each with its own metatheoretic assumptions, research methodologies and adherents. Given the complex and indeterminate nature of the social phenomena studied within these fields, the existence of a plurality of perspectives allows the exploration of diverse questions and hence adds breadth as well as depth to the knowledge generated. In behavioral IS (Information Systems) research however, such a diversity of research schools is not evident.

In this paper we suggest that while no clear, collective theory binds the IS discipline, there appears to be an implicit agreement among IS researchers about the underlying nature of the phenomena to be investigated and what constitute appropriate research methods. In section two of this paper we provide evidence for such a collective methodological tradition, and why we believe such a monolithic approach to studying phenomena can be limiting. In sections three and four we propose and explore a methodological tradition which can supplement and enrich IS research endeavors, and in section five we outline some research themes that could benefit from such methodological diversity.

2. SUBSTANTIVE VERSUS METHODOLOGICAL PARADIGMS

Much recent self-reflection of the IS discipline has involved a discussion of paradigms¹ and the status of IS research *vis-a-vis* the norms of what constitutes a scientific discipline [Benbasat 1985; Blair 1982; Culnan 1986, 1987; Culnan & Swanson 1986; Hamilton & Ives 1982; Keen 1980; Klein & Welke 1982; Weber 1984]. In all the above studies the focus has been on identifying and articulating substantive² research paradigms or sub-paradigms. We argue here that there is another sense in which a paradigm can inform and unite a discipline, that is, through methodology. The concept of a methodological paradigm draws on Kuhn's [1970] notion that the method of puzzle solution is as important to a scientific field as is the substance of the puzzle itself [Blair 1982].

¹The significance of paradigms for scientific activity has influenced much work in the history and philosophy of science [Bernstein 1978, 1985; Hacking 1981; Kuhn 1970; Ryan 1970, 1973]. One definition given by Kuhn [1970:10] is that a paradigm includes "law, theory, application, and instrumentation together . . . [providing] models from which spring coherent traditions of scientific research."

²We wish to make a clear distinction here between substantive and methodological paradigms. The former refer to content in the sense of knowledge about phenomena, such as theories about systems implementation or human-computer interaction. The sense of methodology refers to form, the strategies and techniques employed to pursue knowledge about phenomena, such as those underlying the execution of case studies or protocol analysis.

2.1. Evidence of a Methodological Paradigm

In a recent assessment of research into Industrial and Organizational Psychology, Webster & Starbuck [1988] conclude that I/O psychologists, while not having achieved much theory consensus, have attained "shared beliefs, values, and techniques ... [they have what] would seem to be a methodological paradigm rather than a substantive one" [1988:111]. Similarly, we suggest that in the IS field there is no single substantive paradigm. Evidence for such a lack can be found in Culnan's [1986] bibliographic citation analysis of MIS research publications (1972 to 1982), which established nine distinct (and disparate) research areas in the IS community. Further, Culnan [1987], again employing bibliographic citation analysis, identified five intellectual subfields within current MIS research, suggesting "that while MIS is still pre-paradigmatic, it has made progress, if one accepts the argument that MIS, like all social sciences, is a multiple paradigm discipline" [1987:347].

As in I/O psychology we wish to argue that while there is no substantive paradigm, there is a paradigm underlying much of the activity constituting the field of behavioral IS research,³ and this bears the form of a methodological rather than a substantive paradigm. To explore this assertion we examined the behavioral IS literature published from January 1983 to May 1988 in four major IS outlets. These sources were: Communications of the ACM, ICIS Proceedings, Management Science, and MIS Quarterly. See figure one for the distribution of behavioral IS research published across these four sources. As we are concerned with research conduct we excluded any conceptual or framework articles from consideration. A total of 155 empirical research articles were included in this analysis.

-----Insert figure one here-----

The research articles were categorized along several different dimensions. The first used Culnan's [1987] five research categories. These categories include research foundations, macro approaches to MIS, micro approaches to MIS, MIS management, and MIS curriculum. Culnan's foundation and curriculum categories were discarded as we were only concerned with empirical research. The distribution of articles by Culnan's categories is presented in figure two. This data confirms Culnan's [1986, 1987] conclusions in that, as in her studies, there does not appear to be one dominant substantive paradigm but rather several different and distinct streams of research.

-----Insert figure two here-----

To explore the extent to which a methodological paradigm exists in behavioral IS research, we

³We specifically limit our remarks to IS behavioral research, as we believe this is the sub-discipline that can most benefit from multiple methodological approaches

<u>Journal</u>	<u>Frequency of Articles</u>	<u>Percent</u>
Communications	56	36.1
MIS Quarterly	49	31.6
Proceeding of ICIS	43	27.7
Management Science	$\frac{7}{155}$	$\frac{4.6}{100\%}$

Articles per Journal
Figure 1

Culnan [1987]		
<u>Research Category</u>	<u>Frequency</u>	<u>Percent</u>
Individual Approaches to MIS Design & Use	85	54.8
MIS Management	36	23.3
Organizational Approach to MIS Design & Use	$\frac{34}{155}$	$\frac{21.9}{100\%}$

Articles Classified by Research Category
Figure 2

analysed the sample in three different ways. The first is by research design, the second by epistemology and finally by time frame of the study. A discussion of the consequences of our findings is deferred to section 2.2. Figure three presents the first breakdown showing the frequency of the various research designs. The three primary research designs which emerged from this analysis are case studies (13.5%), lab experiments (27.1%) and surveys (49.1%). These three designs account for almost 90% of the studies. Surveys, however, were clearly the dominant research method in this sample.

-----Insert figure three here-----

Articles were then examined for the underlying epistemology which guided the research. Each study was classified as descriptive, interpretive or positivist. Additional categories were possible as we allowed the data to generate the classification scheme. These three, however, proved adequate for describing the entire sample. In descriptive studies there is no theoretical grounding or interpretation of the phenomena, rather the studies are straightforward "factual" accounts of events which are viewed as illustrating some issue of interest to the researchers. Little theory building or theory testing is possible under such conditions. Descriptive articles typically were case studies and used simple frequencies and percentages. Positivist studies are premised on *a priori* fixed relationships within the phenomena which are studied with structured instrumentation. Such studies serve primarily to test theory. Interpretive studies explicitly adopt a nondeterministic perspective, attempting to explore the phenomena of interest in its natural setting, deliberately not imposing any *a priori* understanding on it. Figure four shows the breakdown of articles by epistemology. Positivism is the predominant epistemology accounting for 72.9% of the studies, followed by descriptive studies with 23.9%, and lastly by interpretive studies at only 3.2% of the sample.

-----Insert figure four here-----

The data was finally analyzed by the time period of the study. Four different categories were sufficient to classify the data. Studies could be one shot cross-sectional, cross-sectional over multiple time periods, longitudinal, or involve process tracing such as protocol analysis. Protocol analyses were classified separately as they do not neatly fit into the other categories. They employ continuous data collection, but are not truly longitudinal as the trace is typically conducted over a single discrete event - such as a meeting or problem-solving exercise - lasting a short period of time such as a few hours. We distinguished between multiple time period cross-sectional studies and longitudinal ones; the former employ some measure(s), administered at several time intervals, providing many discrete snapshots of the phenomenon; the latter are continuous studies where the researcher engages with the phenomenon over an uninterrupted period of time, such as a few months or years, and typically focussing on issues of

<u>Research Design</u>	<u>Frequency</u>	<u>Percent</u>
Survey	76	49.1
Lab Experiment	42	27.1
Case Study	21	13.5
Multiple Design	5	3.2
Field Experiment	4	2.6
Instrument Development	4	2.6
Protocol Analysis	2	1.3
Action Research	<u>1</u>	<u>0.6</u>
	155	100%

Articles Classified by Research Design
Figure 3

<u>Epistemology</u>	<u>Frequency</u>	<u>Percent</u>
Postivist	113	72.9
Descriptive	37	23.9
Interpretive	<u>5</u>	<u>3.2</u>
	155	100%

Articles Classified by Epistemology
Figure 4

process. The breakdown of articles by time period is presented in figure five. Static, one shot cross-sectional studies are clearly the predominant form of research in IS. These studies account for 90.3% of the articles in our sample. Longitudinal and multiple time period studies account for only 3.9% and 4.5% of the sample respectively.

-----Insert figure five here-----

The figures collectively show that while no one substantive paradigm dominates behavioral IS research, there clearly is a dominant methodological paradigm. The methodological paradigm which directs most IS research is similar to that found by Webster & Starbuck [1988]. The majority of behavioral IS research has adopted a postivist epistemology, is primarily survey or laboratory oriented investigating phenomena within a single cross-section or slice of time. It is not clear, however, that researchers realize that by adopting a methodology they are also implicitly accepting some basic assumptions about the nature of IS phenomena (i.e. the ontology) and how these should be studied (i.e. the epistemology).

2.2. Consequences of a Methodological Paradigm

While a single perspective is appropriate for investigating certain classes of problems, we suggest that given the nature and complexity of the phenomena investigated by behavioral IS researchers, a number of additional methodological paradigms might also serve to inform our research endeavors. This view reflects Galliers & Land's [1987] as well as Weick's [1984] assessment of IS research activity, in which they encourage IS researchers to examine the role of *a priori* assumptions in their theoretical and methodological choices. Weick writes [1984:129] "The question of the appropriate methodology for studying technology impact is woven into issues of theoretical substance much more tightly than people might realize - or prefer. What people "see" when they use various methods is largely a function of their prior beliefs or what they expect to find. Researchers in MIS usually expect to see rational systems, and they usually find them. What they fail to see is that additional processes and variables affecting technology impact lie outside their rational combination." Weick briefly examines 27 different research methods that may all contribute to investigating issues of technology use in organizations. He concludes by noting that a broader methodological approach to IS research "especially when the issues in technology and organizations are at a formative stage ... is much more likely to help MIS researchers see their subject more accurately" [1984:129].

Through this paper we wish to encourage a greater awareness and understanding of the diversity of epistemological and methodological issues underlying social research, so that the practice of IS researchers may draw on a rich array of methodological perspectives. As a maturing research community IS researchers would benefit by having insight into "the appropriateness of different kinds of knowledge

<u>Time Period of Study</u>	<u>Frequency</u>	<u>Percent</u>
Cross - Sectional: single snapshot	140	90.3
Longitudinal	7	4.5
Cross - Sectional: multiple snapshots	6	3.9
Protocol Analysis	$\frac{2}{155}$	$\frac{1.3}{100\%}$

Articles Classified by Time Period of Study
Figure 5

for different purposes [so that they can] explicitly select a mode of inquiry to fit the nature of the problematic phenomenon under study, the state of knowledge, and their own skills, style and purpose" [Evered & Louis 1981:386]. This echoes Benbasat's [1985:61] recommendation that the choice of a research approach depend on "the characteristics of the problem being researched." While his suggestion is limited to a choice among positivistic research strategies, we extend this proposal to include strategies based on assumptions other than the traditional positivistic ones.

We wish to make a similar argument to that postulated by Daft & Wiginton [1979] for management research, that positivistic methodologies (which they refer to as "low variety" techniques) are not complex enough to reflect the inherent complexity, ambiguity, and instability of organizational systems. Invoking the principle of requisite variety, they encourage the use of "high variety" (interpretive) methodologies, noting [1979:187] "If complex organizational behaviors are modelled as if they are simple, well understood, deterministic systems, or even as stochastic systems, then the resulting models will tend to be insignificant. We propose that languages of high variety are useful tools for developing models of organizations because they have sufficient scope and richness of meaning to describe organizational processes." Similarly we argue that the methodology dominant in the IS research discipline has insufficient variety for the nature of the phenomena investigated by behavioral IS researchers. We explore this nature in the following section.

3. BEHAVIORAL IS RESEARCH

The body of IS research that is concerned with studying the interaction of IS and humans at both micro and macro levels of analysis is commonly referred to as "behavioral IS research", and we shall continue to employ that label here. Behavioral IS research involves the exploration of numerous substantive issues, and reflects various levels of analysis. For example, behavioral IS studies explore human factors, cognitive modeling, elicitation and representation of knowledge, interpersonal communication and co-ordination, structures of responsibility and authority, centralization vs decentralization, decision-making, project management, systems development, training and implementation, job and task design, control of work and workers, changes in skills, productivity, standards, procedures, and strategy. A number of different units of analysis are implicated in this research, such as those involving individuals, work groups, organizations, institutions, organizational networks (national and multi-national), occupations, and societies.

By and large, the fundamental theme underlying these diverse areas of interest is a concern with understanding the practical implications, potentialities, and limitations of integrating information technology (as information systems) into human life. Galliers & Land [1987:900] express this when they

note that "our field of study ... is concerned with IS and their relations with the organization and the people they serve." Given such a domain of interest, we can make a few observations about some of its significant and common characteristics:⁴

- Information technology is a medium, and shares with all media the inherent feature of non-neutrality. It is, as Turkle [1984:15] points out, a constructive as well as a projective medium. Utilising the evocative analogy of the computer as a Rorschach, Turkle [1984:320] shows how information technology serves as "a cultural object which different people and groups of people can apprehend with very different descriptions and invest with very different attributes". IS thus assume different meanings for different people [Kaplan 1983].
- Information technology is a human artifact. IS are designed, developed, implemented, modified and used by humans in predominantly social settings (administrations, schools, businesses, laboratories). IS are not "naturally occurring phenomena"; they do not exist outside of deliberate, ongoing human action.
- The "human life" dimension of our research questions is - in contemporary society - complex, dynamic and intrinsically social and political. Ours is overwhelmingly an "organization age" where much of human interaction occurs in and is mediated through the conditions, procedures and locales of modern institutions. An understanding of human behavior must reflect its essentially contextual features, that is, that it occurs within social and political milieux, and that these milieux are constantly changing.
- As a consequence of such a characterization of technology and human affairs, it is clear that the relationship between IS and human behavior similarly does not exist in a vacuum, but is situated in both time and space. The two elements in the relationship are not independent, but rather mutually influence each other in ways that are contingent on various temporal, political and social factors. Hence to understand the integration of IS into human affairs we need to grapple with the intrinsically social and dynamic nature of the relationship, and this requires an investigation of social process. In the light of such a characterization, we suggest that simple, uni-directional, cause-effect relationships do not adequately capture the complex nature of the phenomena studied by behavioral IS researchers, nor can they reflect the reciprocal interdependence posited among its dimensions.

Much of the behavioral IS research being conducted today is concerned with the ongoing relationship existing between information technology and individual and organizational realities. Implementation studies for example, [Alavi & Henderson 1981; Franz & Robey 1984; Ginzberg 1981; Lucas 1981; Markus 1983], are concerned with how, over time, we successfully introduce information technology into organizations. Systems development researchers [Bostrom and Heinen 1977a, 1977b; Mumford & Weir 1979] are concerned with how we build systems that are efficient and effective and that also increase users' job satisfaction. There is a large and growing interest in computer-mediated support of communication, collaborative work, and group decision-making [Donnellon et al. 1985; Hiltz & Turoff 1985; Sproull & Kiesler 1986; Suchman 1983]. IS personnel researchers [Bartol 1983; Baroudi 1985; Ivancevich et al. 1983; Weiss 1983] are concerned with understanding the processes which result in job dissatisfaction, turnover, and stress. Other researchers have focused on the power shifts generated by technology and technological dependence [Lucas 1984; Markus & Bjorn-Anderson 1987; Saunders &

⁴This characterization relies heavily on the view of the world explicated by Berger & Luckmann [1966]

Scamell 1986] Many studies have been conducted into the effects of computerization on job skills and employment levels [see the review of studies by Attewell & Rule 1984]. And the "impacts school" of IS research examines the implications (individual, organizational, and societal) of widespread use of IT [Bjorn-Andersen & Pederson 1980; Danziger et al. 1982; Kling 1978; Kling & Iacono 1984; Laudon 1974; Olson & Primps 1984; Turner 1984; Zuboff 1988]. These are only a sampling of topics that one can find under investigation yet all share a common thread. All are concerned with the social processes surrounding the introduction, creation, use/disuse of information technology, as portrayed by Kling & Scacchi's [1982] metaphor of the ongoing "web of computing".

To date, as evidenced by the analysis in section 2.1, most IS research reflects a positivistic orientation, a research tradition that has its roots in the natural sciences. As a consequence, underlying assumptions in IS research about the reality to be studied, reflect the precepts informing the study of natural phenomena [Lincoln & Guba 1985:36]:⁵

- The phenomenon of interest is single, tangible and fragmentable, and there is a unique, best description of any chosen aspect of the phenomenon;
- The researcher and the object of inquiry are independent, and there is a sharp demarcation between observation reports and theory statements;
- Nomothetic statements (law-like generalizations that are independent of time and context) are possible, which implies that scientific concepts are precise, having fixed and invariant meanings;
- There exist real, uni-directional cause-effect relationships that are capable of being identified and tested via hypothetic-deductive logic and analysis;
- Inquiry is value-free.

The application of these premises to research on social process is somewhat problematic, as a review of the prior characterization of behavioral IS research will reveal. To paraphrase Morgan [1983:385], the more we recognize that information processing is a social practice that impacts on a social world, the less appropriate natural science approaches become. It appears that the positivistic research tradition, most commonly adopted in IS research studies [Galliers & Land 1987; Weill & Olson 1987], is not entirely compatible with what we know about the phenomena we are investigating. The result is a dissonance between the elements of our substantive theories (and the assumptions they make about the nature of IS in human life), and our methodological paradigm (whose epistemological premises reflect certain assumptions about the phenomena of interest). Such a dissonance in our research endeavours affects not only the development of theory, but also the practice of IS work. The findings of IS research

⁵Recent work in the post-empiricist philosophy of science [Bernstein 1985] has begun to question the validity of these assumptions for the practice of natural science. To the extent that the positivist dogma lose their currency among mainstream natural scientists we should begin to see a growing interest among social scientists for additional research perspectives of the sort discussed in this paper

filter into the practitioner community and are used as prescriptions for action. Simplistic and reductionist research thus will have far-reaching consequences.

We suggest that research into intrinsically social and dynamic phenomena⁶ can benefit from exploring the utility of additional research paradigms beyond positivism, and attempt to obtain a better resonance between substantive theory and methodology. In particular we believe that it is imperative that the research strategies adopted by IS researchers be compatible with the underlying ontological premises of behavioral IS research. Morgan & Smircich [1980] argue that different ontological assumptions, "world views", or conceptions of reality favor different methodological approaches to studying reality. As an illustration, consider implementation. Clearly a central aspect of this phenomenon is its processual nature [Boland 1978; Ginzberg 1981], and hence it makes sense to employ a methodology that examines, rather than suppresses, this essential component.

Social processes such as IS implementation, diffusion of innovation, group decision making, computer-mediated communication, and the like, are suited to research strategies that will examine them over time and as situated in, not abstracted from, social context. Instead as Boland & Day [1982:31] indicate "the methods of the orthodox approaches to social theory do not lend themselves well to the study of the process itself ... Hence when process is studied it is through a quantitative measure of predetermined categories that purport to be what is "real" about the social world." But we need not be bound by the limitations of the orthodox approach. Vitalari [1985:243] suggests that "[L]ongitudinal designs permit the exploration of time-dependent phenomenon such as learning, adaptation, and evolution within the research setting. For many research issues confronting the Information Systems field, longitudinal designs offer great opportunity for scientific progress." Franz & Robey [1984:1202] used a longitudinal study to investigate user involvement in systems design. They found that including the time dimension improved measurement validity and facilitated alternative interpretations of phenomena. The data collection process allowed for the capture of respondents' interpretations of events as they occurred, hence avoiding the possibility of rationalization that often occurs with retrospective data collection.

Our premise is that all scholarly modes of inquiry generate understanding of social reality. However, the nature, depth and range of such knowledge, as well as the criteria employed in its evaluation, vary substantially. Essentially we posit that the difference between the various research paradigms is not one of degree (one being more quantitative, say), but rather one of kind. The discrepancy between the paradigms is more than merely methodological, having deeper roots, in

⁶which we believe behavioral IS research is concerned with. This point is also stressed by Gulnan [1987:347] and Galliers & Land [1987:901].

philosophy. Hence we find that the two research approaches we discuss in this paper reflect different assumptions about social reality (ontology) and about what constitutes legitimate knowledge of that reality (epistemology); in fact, they evince the fundamentally different goals of individual researchers [Rosen 1986:9], and the assumptions they bring to their research activity.

In the rest of this paper we outline the tenets and methods of one research paradigm, the interpretive perspective (also known as the "naturalistic paradigm" or "social constructionism") and motivate its use within IS research. We argue that not only are the metatheoretic assumptions of this interpretive paradigm consistent with the nature of many of the phenomena examined by behavioral IS researchers, but that our research results will be enriched through being appropriate to the complex social world in which the research results are applied.

It must be made clear that we do not believe that the positivist and interpretivist paradigms for social research are mutually exclusive, but neither do we see them as essentially interchangeable or entirely compatible. While we believe they can be used together to investigate phenomena, their inherent differences must be respected in order not to dilute the powerful insights that each can bring to the research effort. Our recommendation of interpretive research should not be understood as an intention to replace the existing orthodoxy with an opposing one. Rather we encourage increased reflectiveness and self-consciousness in the use of the different research modes, as suited to the purposes and interest of the researchers. As Morgan [1983:368] notes, there are many different ways of studying the same social phenomenon, and the knowledge gained through any one approach is necessarily partial, biased and incomplete. Our intention here is to urge a recognition of the plurality of diverse research paradigms available and to generate understanding and discussion about their relative appropriateness. What must be guarded against is a blind and mechanistic adherence to any one approach in the uncritical belief that it necessarily, is solely relevant in all research contexts.

The following section briefly explores the underlying tenets of the interpretive perspective, in an attempt to highlight the problematic features of the traditional positivist approach to science. We propose that interpretivism, while not a panacea, may assuage some of the limitations currently frustrating some of our research endeavors. Section five illustrates how the interpretive perspective can be useful in the research efforts of behavioral IS researchers. We conclude with some general recommendations for the IS community.

4. THE INTERPRETIVE RESEARCH PERSPECTIVE

It is not our intention here to discuss the positivist research paradigm, nor to explicitly point out its particular strengths and limitations. Numerous such discussions are available [Boland & Day 1982; Lincoln & Guba 1985; Morgan 1983; Mumford et al. 1985]. We do however wish to draw attention to two crucial issues in the human science research process that are typically overlooked, yet which should influence scholars' choice of appropriate research methodologies.

Firstly, particular research methodologies reflect and reinforce a particular view of reality. For example, positivistic research techniques encourage deterministic explanations of phenomena, in that these explanations emerge from interactions between the researcher and his/her subjects, where the researcher, by definition, dominates the relationship. In the search for causal relations the positivist researcher focuses on the validity and control of the research procedures, and hence adopts a predefined and circumscribed stance towards the phenomenon being investigated. Such a posture is not conducive to the discovery and reflection of indeterminate, non-deterministic, and reciprocal relationships. Laboratory subjects and survey respondents act and react mechanically to the research stimulus. Further, emphasis on causal relationships sets up an opposition between reasons (which refer to actors' intentions or voluntary motives) and causes (which focus on the behavior produced by antecedent conditions rather than the intentional action of knowledgeable actors). As Rowan [1973:210] notes: "Research can only discover one-sided things if it insists on setting up one-sided relationships ... You only get answers to those questions you are asking." Only if we have strong reason to suspect that the relationships underlying our phenomena of interest - information technology and human life - are determinate and one-dimensionally causal, can we utilize such positivist techniques with confidence. As we have indicated in the previous section, and as Markus & Robey [1988] elucidate, there is no reason to suspect that this is the case with information technology and human life.

The second issue pertains to the role played by social research in human life. Unlike the natural sciences where it can be argued that there exists an independence between researcher and phenomenon of study, the same assertion cannot be made for the human sciences. While the results of natural science do not impinge on and change the nature of the phenomena studied, the results of human science do enter into the discourse of everyday human reality, and clearly can and do transform the nature of these phenomena. As Giddens [1987:19] notes, in the social sciences, unlike in natural science, there is no way of keeping the concepts, theories, and findings of the researchers "free from appropriation by lay actors". Clearly behavioral IS research enters into the very constitution of the phenomena it

studies, in a manner not available to natural science.⁷ There is a reciprocal and reflexive relationship between human science research and human life; the two are not independent of each other. In the light of this, claims of objectivity and value-neutrality in the human sciences become problematic.

4.1. What Is an Interpretive Perspective?

In this section we focus on the intrinsic premises of the interpretive paradigm, which is receiving increased attention and popularity in many social science fields (organizational studies, political science, sociology, marketing, education and social psychology). A fundamental distinction between the interpretive and the positivist paradigms is the former's primary presumption of social constructionism. Interpretivism asserts that reality, as well as our knowledge thereof, are social products and hence incapable of being understood independently of the social actors (including the researchers) that construct and make sense of that reality. The world is not conceived of as a fixed constitution of objects, but rather as "an emergent social process - as an extension of human consciousness and subjective experience" [Burrell & Morgan 1979:253]. The basic premise is that "any individual in understanding his world is continually involved in activities of interpretation" [Winograd & Flores 1986:28]. The aim of all interpretivist research is to understand how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning. As Denzin [1983:132] notes, because "man is caught in webs of significance, feeling, influence and power that he has woven, then the interpretive task is one of unraveling and revealing the meanings persons give to their webs."

The interpretive perspective emphasizes the importance of subjective meanings and social-political as well as symbolic action in the processes through which humans construct and reconstruct their reality [Morgan 1983:396]. In particular, this tradition does not presume that social structure, culture or relations are given and unproblematic, but attempts to understand how and why individuals, through their socialization into, interaction with, and participation in, a social world, give it meaning. Meaning and intentional descriptions are important not merely because they reveal subjects' states of mind which can be correlated with external behavior, but because they are constitutive of those behaviors. "If we are to understand what human beings are, then we must uncover those models, interpretative schemes, and tacit understandings that penetrate human thought and action" [Bernstein 1978:230]. Meanings and implicit models, assumptions, and interests are never to be taken for granted (as they are in positivist research), but are always to be understood as historically and contextually situated [Morgan 1983:397]. Thus the underlying premise of the interpretive researcher is "that individuals act towards things on the

⁷This is particularly evident in areas such as end-user computing, implementation, IS management, staffing, task design, group support, and the strategic use of information technology

basis of the meanings that things have for them, that meanings arise out of social interaction and that meanings are developed and modified through an interpretive process" [Boland 1979:260].

In this sense of attempting to understand meaning, positivist approaches are not useful: "Human actions are meaningful, and meaning is not a category open to causal analysis; thus so long as meaningful actions form the subject matter of social inquiry, the most important category for our understanding of social life will not be that of cause and effect, but that of meaningfulness and rule-guidedness" [Winch, quoted in Ryan 1970:131]. The primary endeavour is to describe, analyze and understand the social world from the actors' perspective, and any rigid *a priori* researcher-imposed formulations of structure, function, purpose and attribution are resisted [Glaser & Strauss 1967]. Rowan [1973:216] notes that in positivist research "we are talking to "processed people" in the sense that they can only answer in terms of our questions and our categories"; in contrast interpretive techniques allow participants to use their own words and to draw on their own concepts and experiences.

4.2. Features of Interpretive Methodology

Interpretive methodology is premised on the belief that "the complexity of social process cannot be satisfactorily captured in hypothetical deductions, covariances and degrees of freedom. To understand social process one must get inside the world of those generating it" [Rosen 1986:10]. Central here is the focus on meaning formation or sense-making via language, symbols, myths, rituals, ideology and social dramas. Clearly researchers are never able to completely suspend all the theory, cultural knowledge and expectations they bring with them into the field. Some interpretive methods (particularly those of the phenomenological and "grounded theory" schools) insist that the researchers must deliberately attempt to expunge any *a priori* knowledge, so they can adopt a *tabula rasa* perspective and hence arrive at the pure data-generated "essence" of a phenomenon. Most of the other interpretive methods however, propose that an explicit, substantive perspective (albeit a flexible and dynamic one) accompany the researchers' engagement in the field, such that the interviews, archival research, observations and the like, are "accompanied by an overlay of social theoretical ideas ... [that provide] the foundation from which an interpretive, social constructionist analysis may be conducted" [Rosen 1986:15].

The argument of non-generalizability is often raised against studies conducted in the interpretive tradition. It is necessary first to make an important distinction between the positivist sense of generalization (of causal relationships from a sample to the population), and a second mode of generalization that is "the extension from the micro-context to the totality that shaped it" [Burawoy 1985:17]. In the latter view every particular social relation is the product of generative forces or mechanisms operating at a more global level, and hence the interpretive analysis is an induction (guided

and couched within a theoretical framework) from the concrete situation to the social totality beyond the individual case. An example from a study of the systems development process is given by Boland & Day's [1982:33] interpretivist research where they note "What we hope to explore is a deeper structure that can be generalized to other design settings, even though we have only explored a single instance ... [such a structure] is to be tested by its ability to describe the experience of other system designers."

Morgan [1983:398] employs this same usage of generalization, when he notes that "the interpretive researcher is more concerned with identifying generalized processes that are not content specific and therefore cannot be characterized in terms of measured relations between networks of fact, verified rough predictions of outcome". Yin [1984] makes a similar distinction between theoretical generalization and statistical generalization. Even though interpretivists refer to generalizations, these - contrary to those characteristic of positivist methodology - are understood to be indeterminate, as well as temporally and contextually relative. However, over time and through a series of studies, as Weick [1984, citing McGuire] notes, empirical confrontation will serve to establish a theory's pattern of adequacy.

With respect to the crucial issue of evaluating the credibility of interpretive research, we must recognize that "different research perspectives make different kinds of knowledge claims, and the criteria of what counts as significant knowledge vary from one to another" [Morgan 1983:393]. In particular, Weick [1983:165] indicates that those criteria espoused by the positivist tradition are not appropriate for evaluation of interpretive research: "Networks of shared meanings do not lend themselves to study by methods of detachment and objectivity. Instead the researcher is "scientific" in that the collection and sorting of data are done systematically with care and discipline." She suggests that evaluation rests on soundness of the analysis, that is, on how the research contributes to our understanding of social life and the particular setting at hand. Interpretive methodology stresses the importance of submitting the analysis to the actors in the field. This not only allows for verification and criticism but also provides an opportunity for the collection of further information through correction, clarification, and elaboration. Further, as Nissen [1985:49] notes, the adequacy of interpretive studies as "theoretical reconstructions of human experience" will be subject to critical intersubjective scrutiny by the community of scholars, and rejected or refined as appropriate.

A number of interpretive researchers address the question of the "trustworthiness of interpretive inquiry" and attempt to allay the oft-expressed concern that it is somehow "non-scientific".⁸ Pettigrew [1985:246] stresses that primacy should be given to realism of context and to the generation of measures

⁸See Lincoln & Guba [1985] for an extensive discussion of what they term "naturalistic trustworthiness criteria"

that are "sensitively linked to the subtleties and nuances of a particular context or contexts", in contrast to the use of acontextual and blunt instruments. He provides some broad guidelines that can be used to distinguish between good and bad interpretive research [1985:247-249]:

- the research should strike a balance between description and analysis, where the role of description is to clarify and establish the context, structure, and process to be explained by the analysis;
- there must be an empirical and theoretical justification for both the chosen time frame (the horizontal component) and the levels of analysis considered (the vertical component);
- the research should display an adequacy of data sources, i.e. the use of multiple sources and multiple methods of data collection over time, the cross-checking of data across sources and among methods, and the examination of competing theoretical interpretations (or rival plausible hypotheses in the parlance of positivism);
- the findings and analyses need to be interpreted by theoretical themes that represent an attempt at generalization, "at placing the work within a wider scheme of things theoretically and conceptually" [Pettigrew 1985:248];
- the theoretical themes and concepts must be closely coupled to the data.

In their formulation of grounded theory, Glaser & Strauss [1967] discuss four properties that ensure that the grounded theory has practical application. Firstly, the theory must *fit* the substantive area in which it will be used. That is, the theory must correspond closely to the data if it is to be applied to the everyday realities of the substantive area. Secondly, the theory must make sense and be *understandable* to the people working in the substantive area. The intent is for the theory to reveal taken-for-granted assumptions, hence sharpening people's sensitivity to the issues they face, and to indicate images and directions of potential change. Thirdly, it must be sufficiently *general* to be applicable to multiple issues that will arise daily within the substantive area, not just to a single, narrow type of concern. The categories and concepts of the theory should not be too abstract as to be obtuse, yet they need to serve as a general guide to the users in negotiating their ever-changing reality. What is required is diversity which allows the construction of a sufficient number of general concepts with plausible interrelationships so as to be relevant to many situations. Such a theory is not seen as static or "closed", but as a process: the person applying the theory participates in its validation and development. By contrast, Glaser & Strauss [1967:243] note that "A person who employs quantitatively derived theory "knows his few variables better than anyone, but these variables are only part of the picture"... This kind of theory typically does not account for enough variation in situations to allow appreciable institution and control of change in them. Also, such theory usually does not offer sufficient means for predicting the diverse consequences of any purposeful action on other aspects of the substantive area." Finally, the theory must allow the user partial *control* over the structure and process of daily situations, as they change over time. The notion here is that the theory should address issues that "are worth applying the theory to", that is, issues that make a difference in the lives of participants, so that they will have the motivation and understanding to gain

control of situations.

4.3. Types of Interpretive Research

A number of research methodologies within the social sciences have been developed to put into practice these notions of interpretive ontology and epistemology, including phenomenology, ethnomethodology, hermeneutics, symbolic interactionism, contextualism, and ethnography. While there are commonalities among these specific approaches in that all attempt to understand and explain the social world primarily from the frame of reference of the participants, there are differences in what constitutes the focus of study. For example, phenomenology is concerned with methodically studying consciousness in order to understand the essence of experience [Boland 1985:194]. The intent is to provide a self-reflective description of the situation of interest, via the interaction of participants and researcher. A conscious attempt is made to mutually explore, define and then deliberately suspend the prejudices and assumptions about the world that the participants and researchers bring to the interaction [Schutz 1967]. For example, Bolland & Day [1982] employ a phenomenological approach in studying a year in the life of a systems designer, mutually exploring with him the various pressures and issues of his daily work life, such as interaction with users, constraints on design, moral dilemmas, and personal biases. Through such a study a number of work concerns and issues relating to systems design emerged that had not been previously revealed by inquiry cast in the systems rationalist mould [Weick 1984:128]. Through such a mutual interviewer - interviewee exploration, the social processes mediating technological development and use became apparent, providing insight into some of the meanings underlying systems design.

Ethnomethodology, a derivative of phenomenology, proposes that cultures or groups evolve common methods for constructing reality. Garfinkel [1967] employs the term *ethnomethods* to refer to those social processes or conventions that people use to negotiate and reach consensus on the nature of reality. The interest is in learning about the ways in which people order and make sense of their everyday activities, and how they account for these to others [Burrell & Morgan 1979:247]. Typically these conventions are implicit and taken-for-granted so that the common assumptions we make about reality become the unspoken "rules" and norms of social behavior and hence come to define and sustain our reality. The research methods adopted by ethnomethodologists aim to understand these underlying assumptions by examining individuals in situations where the "normal" codes of behavior are inappropriate. For example, Zimmerman [1970] studied how receptionists in a public welfare office modified the stated rules of the agency when the purposes for which these rules had been instituted were not being achieved.

Symbolic Interactionism examines the process by which individuals interpret the situation they are in, and how they construct their acts accordingly [Boland 1979:260]. Symbolic interactionists believe that social action and interaction is only possible through exchange of shared interpretations and the establishment of social rules. However reality is not to be seen as existing in the rules and routines themselves, but embedded in the meanings the people put on events, situations, and people via the rules and shared routines [Tomkins & Groves 1983:368]. Some symbolic interactionists [Blumer 1969] try to understand the meanings that phenomena have for people, and thereby identify significant forms of social behavior. Other symbolic interactionists examine how individuals influence their social reality by shaping the "presentation" of themselves to others. Goffman [1959] analyses the rules, rituals and routines of human interaction and negotiation, and shows how people use symbolic processes of "situation definition" and "impression management" to conform to or adapt their circumstances in line with their purposes.

Contextualism is concerned with the "event in its setting" [Pettigrew 1985], and the primary focus is the historical situatedness of the phenomenon of interest. For example, Pettigrew [1973, 1979, 1985] studies the relationship between organizational structure and process over time and space, via in-depth immersion in and longitudinal exposure to a particular organizational setting. The focus is less on subjective or interpersonal meaning construction, as on identifying the mechanisms of continuity and change, that is, the processual dynamics of various contexts. For example, Pettigrew [1973] studied the organizational processes in the ongoing decision-making surrounding the purchase of computer resources in one British firm. Through in-depth analysis over time, Pettigrew examines the changes wrought by such decisions on the relations of dependence among occupational groups within the organizational context.

Ethnography is an anthropological method for both data collection and analysis. The ethnographer's method for collecting data is to live among and observe those who are generating the data. He or she tries to learn the subjects' rules for social life, to interact with them for a frequency and duration of time "sufficient" to understand how and why they construct their social world as it is, and from there to explain it to others. Interpreting the meaning behind behavior is the basis for ethnographic research.⁹ Geertz [1973] identifies the cultural form of interpretation as "thick description," a statement of what is observed among a social group based upon action and the meanings that underlie and follow from such action. If the researcher reports observations purely descriptively, primarily focusing on the act devoid of meaning, the audience is given a "thin description" of the occurrence. Thick description, on the

⁹We focus here on a brand of ethnography primarily concerned with "cultural analysis" [Geertz 1973]. However there are many styles or schools of ethnographic research, and interested readers should consult Sanday [1979] for an elaboration of the diversity of thought within ethnographic study.

other hand, is concerned with telling the differences between an involuntary muscle twitch and a conspirational wink, that is, of description imbued with interpretation. Ethnographic description is not to be confused with the recountings that would be provided by the actors themselves in a social setting. It is, instead, an explanation cast in the theory and language of the researcher. It is a second order recounting [Geertz 1973:15] in that the researcher is making interpretations of data obtained indirectly through participant observation or interview.¹⁰

Despite the roots of ethnography in early social anthropology, it was not until the 1970's that ethnography was employed as an epistemology and a methodology within organization theory [Van Maanen 1979, 1988]. The emergence of organizational ethnography reflects the growing awareness that "Organizations are not simple systems like machines or adaptive organisms; they are human systems manifesting complex patterns of cultural activity ... [they] are by their very nature, symbolic entities" [Pondy et al. 1983:4]. According to Van Maanen [1979:540], a principal aim of ethnography - and here he is specifically speaking of organizational ethnography - is to "uncover and explicate the ways in which people in particular work settings come to understand, account for, take action, and otherwise manage their day-to-day situation." Organizational ethnography is a methodology for "seeing" and interpreting the components of organizational structure and processes as organizational life is created and maintained. The method of organizational ethnography is not to simply recount the organizational experiences of individual members, but rather to use social theory to explain these experiences, which in turn, expands and refines social theory.

All of these research methods can offer a refreshing and insightful perspective on the phenomena of interest in IS research. In the following section we will illustrate the contributions that such approaches can make to research into IS phenomena.

5. INTERPRETIVE IS RESEARCH

Having outlined some of the assumptions and methodologies of an additional research paradigm, we now consider its applicability to specific examples of behavioral IS research. In our sample a majority of articles were found to follow traditional positivistic approaches. We do, however, see an increased recognition of the need for additional approaches, and we believe the behavioral IS research field is accepting the utility of a variety of research approaches. Recent discussions [Boland & Day 1982; Benbasat, Goldstein & Mead 1987; Franz & Robey 1984; Galliers & Land 1987; Lee 1988; Mumford et al. 1985; Weick 1984] draw attention to the value of such additional forms of inquiry for IS research.

¹⁰On a similar theme see Van Maanen [1979] on first and second order constructs

Particularly interesting is the recent collection of research articles published in the Communications of the ACM [November 1988] where investigators explored the nature and exigencies of systems design by means of non-positivistic methodologies such as *ecological design* [Soloway et al. 1988; Curtis, Krasner & Iscoe, 1988; Rosson, Maass & Kellogg, 1988]. Such methodological diversity is welcome and bound to increase the insights we generate about the phenomena of interest to the IS research and practitioner communities.

5.1. Choosing the Appropriate Research Approach

We see both positivist and interpretivist studies as useful vehicles for studying information technology in organizations. What we urge however is that these methodologies be used prudently, so as to deliberately exploit the strengths of each. We recommend that epistemological choices about research approach and technique be made consciously and with attention to the particular nature of the phenomenon under investigation. It is commonly held that positivist studies are suited to testing established effects, and less appropriate for exploring relationships or explaining the meaning of findings. This same wisdom holds that qualitative or interpretive research is only appropriate for exploring phenomena. However we do not see it as only serving as a precursor to positivist research (as has been suggested by a few commentators). On the contrary, it can stand on its own, providing unique and valuable insight into the reciprocal complexity of social processes. However we feel that the most fruitful approach to studying information technology in organizations is to employ a whole repertoire of approaches and techniques each of which can complement and enhance each other. The caveat is that researchers be mindful of the implications that follow the adoption of any one methodology's set of assumptions.

Positivist research is particularly suited to studying structural causes of human behavior, as the assumptions underlying this methodology posit the social system as ontologically prior to the individual actors. Hence researchers adopting positivist methodology will focus on and investigate external forces as predictors of social action. This is appropriate if researchers realise that they are omitting a whole area of social relations - the interactive, human action dimension that revolves around shared meanings, interpretations, and the construction of a cultural and social reality. Likewise, interpretive research is useful for investigating the enactment of a shared, social reality by understanding human behavior from the point of view and through the interpretive schema of the human actors themselves. However researchers adopting this interpretive perspective need to understand that their methodological choice limits their ability to investigate the structural pressures on social action.

Both structural and action-oriented perspectives on social relations are important and worthy of

study [Giddens 1979]. Hence both methodological perspectives can contribute to our understanding of information technology use in organizations, provided each does not claim to be the only *valid* way of investigating the phenomena of interest to our discipline. We thus recommend that positivist and interpretive approaches be combined, either within or across studies, so as to yield complementary and relevant insights. We can envision a number of scenarios where creative combination of research approaches can bring different influences to bear on the phenomena being investigated.

Kaplan & Duchon [1988] adopted such an integrative approach in their investigation of the impact of IT in a medical setting. They note a number of benefits of this approach: (i) the inconsistency of results between interpretive and positivist data collection and analyses techniques prompted further exploration, yielding deeper insights and alerted the researchers to potential analytical errors and omissions; (ii) the research design allowed for the development of context-sensitive measures as the positivist questionnaire was developed on the basis of the interpretive unstructured interviews and participant observations; (iii) it allowed for the exploration of interactions and hence avoided simplistic one-directional causal relationships. Lee [1987] argues for using positivist and interpretive approaches in a mutually supportive way with the positivist studies testing the hypotheses generated by the interpretivist studies. This is the ideal scenario presented for combining these approaches. Weick [1985:575] in contrast, suggests that reversing this traditional order is more useful, noting that qualitative research can often shed light on relationships suggested, but not explained, by quantitative techniques. He writes "To understand the ways in which a data table is nuanced, what the data mean, and how people generated the activities summarized in the numbers, one must treat the table as a preliminary display that triggers serious descriptive analysis. ... Quantitative studies produce discoveries, the meaning of which is known only after they are verified qualitatively."

While positivist and interpretive research approaches can be utilized within and across studies, we must not stress enough how important it is for researchers to be cognizant of the limitations inherent in their methodological position. This will ensure that researchers do not inadvertently distort the phenomenon being investigated. To illustrate consider a positivist longitudinal research design, in which the variables of interest are prespecified, measures of the variables are decided upon, the time intervals for measurement are preselected, and the hypothetic-deductive model of analysis is employed. Researchers may thus find that one variable (say, A) is positively related to another (say, B) at interval t , and negatively related at interval $t+1$, but know nothing about the underlying process or reason for the relationship. It may be that variables A and B are simply the surface manifestations of more fundamental, even contradictory forces, and hence should not be the primary focus of interest, but such insight will go undetected. Further the design implicitly presumes stability of the variables and so, by definition, discounts the operation of social

processes.

Consider another example: Assume researchers are interested in studying the relationship between user satisfaction with a system, and use of that system. Imagine that they find that initial use (after three months) is very high and then tapers off over the next six months with use finally stabilizing at a rate much lower than initial use. Contrast this with the scores they obtain on user satisfaction with the system. Initially, the satisfaction levels are low but over time they increase, stabilizing at a high level. If the researchers correlate the data they will find that use and satisfaction have an inverse relationship over time. Now have the researchers demonstrated that use declines as satisfaction increases, or was the learning curve just much longer than the anticipated initial three months? Was it just that the system was difficult to learn (hence the initial level of high use and low satisfaction) and that as users became more proficient and discovered its functionality they began to accomplish more with less use (lower use but higher satisfaction)? Or was the measure of use inappropriate? Does computer connect time or number of queries issued tell us much about how the data is used once it is retrieved? Is the data filed, discarded or does it play a central role in directing a person's activities? Perhaps there are some other possible explanations for the observed relationship. Indeed we are left with an incomplete understanding of the underlying processes that would explain the occurrence of the observed events. The point to note here is that for a positivist approach to capture the richness of the users' experience and the social mechanisms of change, multiple time frames and many dependent and independent variables would be required. This would make the analysis complex and unwieldy, if not impossible. An interpretive approach, we believe, is a viable alternative in such cases.

5.2. Specific Research Scenarios

In the following discussion we draw on a number of streams of behavioral IS research and attempt to provide some illustrative scenarios where an interpretive perspective might usefully be used. This discussion is by no means meant to be prescriptive, but rather suggestive and hopefully provocative.

(i) Impacts Research: Many of the studies into the "impacts" associated with the implementation of IT have been inconclusive. Attwell & Rule [1984], in reviewing the literature on the effects of computing in organizations found very few clear cut answers. In their conclusions they state: "The sheer variety of disparate and seemingly conflicting conclusions that can be derived from the studies noted may seem to warrant despair. Why do all these works add up to few conclusive results?" [1984:1190]. We propose that the problem may be that the positivist research paradigm that informs many of these studies results in static snapshots of technological use with retrospective measures of work and skill changes, which may be obscuring more than they reveal. It is no coincidence that highly structured, deterministic questionnaire

surveys of IT impacts reveal substantially different results to those studies employing in-depth, unstructured, qualitative interview or case study techniques.

Typically a one-way causal model is implicitly or explicitly proposed with technology's "impacts" on various factors measured (employment levels, organizational performance, individual productivity, skill changes, job satisfaction, alienation and so on). In positing technology as an independent variable such research fails to recognize that technology itself is a dependent variable, depending on various acknowledged and unacknowledged conditions of action. The discrepancy in findings may be due to researchers not recognizing that both kinds of consequences and conditions invariably exist in social settings. As a result the various studies conducted may have tapped different elements of this phenomenon, the structured surveys obtaining data exclusively on deterministic and intended effects, while the more unstructured studies finding some spontaneous and unintended impacts. We do not believe that either exclusively "positive" or "negative" impacts exist in different situations, and neither do we believe that technology is deterministic. Rather a continuum of consequences result from IT implementation, both anticipated and unanticipated. We contend that it is the unintended consequences and unanticipated conditions of IT use that we currently know least about, and that these can fruitfully be explored via interpretive research approaches.

(ii) Power Research: Markus and Bjorn-Anderson [1987] in a recent paper have proposed, contrary to prior positivist studies of power relations surrounding the IS department [Lucas 1984; Saunders & Scamell 1986], that IS personnel exert considerable power over users. Exploring such a hypothesis would be usefully conducted via a longitudinal qualitative study which would attempt to identify and articulate the meaning and influence systems operating for IS personnel and users from the perspective of each of these groups of participants. The contribution of such an approach would be the explicit disavowal of *a priori* structural categories about expected effects and influences, such as characterized the prior studies, limiting their explanatory power and possibly contributing to their non-intuitive findings.

(iii) Research into IS Work: IS work constitutes a diverse and multi-faceted occupational sector in which turnover and role stress are prevalent features [Baroudi 1985; Bartol 1983]. Few studies of IS workers however, have attempted to understand the dynamic and contextually contingent nature of specific IS jobs across different industries at various occupational levels. Yet IS workers are facing significant challenges, to be more productive and more strategic in their application development, to be more responsive to users' information needs, to improve their maintenance work, to support burgeoning end-user computing efforts and micro-computer proliferation, to stay current with the latest technological wizardry, and to deal with the automation of their own work through the introduction of application

generation and CASE (Computer-Aided Software Engineering) tools. Conducting ethnographies of IS departments, or longitudinal contextualist studies (as exemplified by studies such as Pettigrew [1973] and Franz & Robey [1984]), the richness and complexity of the social relations affecting IS workers can be explored, e.g. dual career paths, user interaction, managerial authority, peer collaboration and conflict, resource pressures, political and symbolic influences, changes in the role of the IS department within the organization, changes in expectations about IS service, and the role of technological change.

(iv) Research into End-Users: End-users are beginning to figure more, and more prominently in interaction with IS workers, as techniques of end-user computing, prototyping, and participative design become instituted in organizations, and as users become more computer-fluent and more sophisticated in their expectations and demands for IS. The relations of users to IS work is one typically described in the IS literature by stereotypes such as "resistance", "computer-illiteracy", and "uninvolvement", and captured via measures of user satisfaction, computer system use, and extent of participation in system development projects. Measures of such stereotypes propagate a view of the users as passive and uninterested, or even hostile to IT. This view influences the research analysis, focusing attention away from portraying users as knowledgeable, capable actors, with a stake and interest in their work, skills and autonomy. An interpretive approach would encourage an exploration of users' involvement in systems development and use from the users' perspective, one which focuses on their concerns, concepts, meaning structures, priorities, and that attempts to capture the ongoing rules and relations that characterize their perceptions, activities, and experiences. Insight into the social and cognitive world of users may assist our understanding of user involvement in, and experience with, IS implementation and use.

(v) Organizational Culture and IT Research: Organization culture is a topic receiving much currency recently in the management literature. The role of IT in contributing to, or changing, this culture, as well as the manner in which the organizational or group culture shapes the features and usage of IT, are areas of IS research that need attention. The results have implications not only for how IS are developed, maintained and operated, but also for how decisions about the IS resource in terms of strategies, plans, and priorities are enacted and implemented. Further, the features of corporate and functional IS architectures emerge not merely from some rational, top-down process of "Systems Planning" or "Structured Systems Analysis", but are heavily influenced by the cultural norms and political interests that are always operative and openly or covertly negotiated. Interpretive research designs are well-suited to examining these sorts of processes, as they are not premised on a vision of social reality as objective and nomothetic. They recognize the power of signs and symbols (information), as embodied in shared languages and organizational culture, to shape social reality and create meaning.

(vi) Research into Collaborative Work: A particularly interesting current area of behavioral IS research is the computer-mediation of collaborative or cooperative work. While much research has and is been conducted into the technologies needed to support such work, little is known about the social relations that facilitate or constrain collaboration. An interpretive design along the lines of an ethnography, a contextualist or interactionist study, could reveal the underlying linguistic codes, social norms and rituals, shared and conflicting assumptions, expectations, values and meanings, rules of interaction, organizational roles (informal and formal), political and economic interests, that configure all interaction among individuals attempting to work together. Understanding such intrinsically social, contextual, and dynamic factors is difficult to do within the circumscribed tenets of positivism.

(vii) IS Research and Technological Dependence: Behavioral IS research has often been criticized [Keen 1980; Weber 1984] for being too technology-driven. IT is a technology that is changing dramatically and exponentially. Positivist research studies that require well-defined concepts and categories before conducting the study are hence dependent on the specific definitions of technology described in their measures. Findings from such research are either highly particular (applying only to narrow kinds of technology) and hence date quickly, or are handicapped by vague, generalized, abstracted and hence ambiguous references to a global category of "IT". In this latter case the validity of the findings are in some doubt, as one is never sure how the many different respondents understood this category. The interpretive approach on the other hand, posits that a universal notion of some objective "IT" is not useful, as the IT installed in any organization is a complex function of multiple contextual and temporal factors (akin to Kling & Scacchi's [1982] "web of computing"). Interpretive researchers allow their understanding of the IT concept and its features to emerge from intimate and extensive contact with the particular IT in the field. Such studies provide rich and contextual understanding of specific IT implementations. Over time and over a number of such research studies in various settings, common aspects and patterns of IT can be developed. Interpretive research cannot be technology-driven for its premise is that IT, as an ongoing subjective and social product, is highly differentiated, dynamic, and dependent on time and locale. Positivist research designs that posit IT as objective and neutral, cannot but respond in knee-jerk fashion every time a new IT innovation becomes fashionable.

6. CONCLUSIONS

We have argued in this paper that there is a need to explicitly select a research methodology which matches the ontology of the phenomena being investigated. We assert that much of what is being studied in behavioral IS research is the social process which surrounds the creation, deployment, and use of IT. Thus the underlying ontology of much of IS behavioral research is not fully reflected in the choice of a positivist research paradigm. We believe that social process, as discussed in this paper, can be usefully

studied with an interpretive methodology which is explicitly designed to capture complex, dynamic social phenomena that are both context and time dependent. We have discussed several areas of IS inquiry and outlined particular research questions where interpretive research methodologies may be usefully employed.

Finally, we must clearly state that it is not our intention to replace positivist methods with interpretive methods. Rather, researchers should be clear as to the nature of the phenomena being studied and the choices they must make in their research endeavors. Then they can choose from their methodological "tool box" the method or methods best suited to capture their interests in the phenomena under study. Morgan [1983:389-391] drawing on Godel's theorem to emphasize that all theoretical formulations are necessarily incomplete [Godel 1962], succinctly captures the message we have tried to convey here: "all social phenomena may have many potential ways of revealing themselves and the way they are realized in practice depends on the mode of engagement adopted by the researcher. ... in choosing a research strategy the scientist in large measure determines how the phenomenon being studied will be revealed, and indirectly, the consequences of the knowledge thus generated." We hope that this paper has stimulated some reflection on the implications of the research tools we employ when we investigate behavioral IS phenomena. What we urge is the reasoned, reflective adoption of rich and diverse methodologies to investigate the rich and diverse arena of the IS discipline.

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